ABSTRACT OF THE DISCLOSURE

An image reconstruction algorithm begins with an initial acquisition of a preoperative imaging volume followed by a second imaging sequence subsequent to an applied deformation. A computational domain (model) is generated from the preoperative image series and boundary conditions are derived from a pre-post deformation comparison, as well as from information gathered from deformation source application (i.e., displacement and/or force). Using boundary conditions, a series of model-based image deformations is accomplished while varying model material properties. A calculation of a Jacobian matrix relating the change in regional mutual information is performed with respect to the change in material properties. Upon completion of this process, matrix regularization techniques are used to condition the system of equations and allow for inversion and subsequent delivery of model-property adjustments.